# Grammatically interpreted task analysis for supply chain forecasting

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**Traditional task analysis models have contributed to a more effective understanding of the tasks involved in different industries. As part of a broader study of interfaces for forecasting systems, we have used hierarchical task analysis to describe the normative process of producing sales forecasts. In order to validate this against reported scenarios and observations of actual use, we are applying an approach that uses a parallel to the grammar of everyday language to map tasks and sub-tasks to scenarios. In this paper we describe the technique and progress in applying this to observed tasks that users follow to produce forecasts in an organizational setting. We hope that the combination of grammar-based task analysis with interviews with users and software designers will enhance our understanding of sales forecasts.**

*Keywords: Task analysis models, grammar based task analysis, forecasting tasks, organizational forecasting, forecasting software systems*

## 1. INTRODUCTION-TASK ANALYSIS OF SALES FORECASTS

We describe initial steps in a systematic grammar task description for sales forecasting, which is complimenting other approaches being carried out in parallel including structured interviews and eye-tracking. According to Dix et al. [3] traditional task analysis techniques like HTA, and Cognitive Walkthrough have been widely and successfully used to hierarchically represent the tasks and its goals using a textual description. Hierarchical Task Analysis (HTA), which is suggested by Shepherd [5] involves task decomposition into subtasks. The outcomes of HTA are a *hierarchy* of tasks and subtasks and *plans* that describe the order and the conditions under which the subtasks are performed. Figure 1(i) shows a simple task analysis of how to clean a house taken from Figure 15.1 in [3].
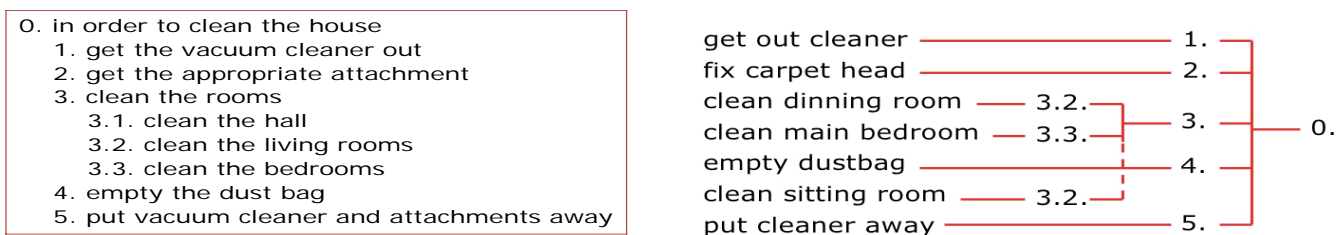


**FIGURE 1:** (i) HTA of cleaning a house (ii) Grammar HTA of cleaning a house

As part of our intention to understand forecasting, an initial normative task analysis was carried out based on descriptions of the process of producing sales forecasts based on the forecasting literature [1, 2, 4]. Figure 2 shows a small excerpt of this normative task tree for sales forecasts, which is substantially more complicated than the 'toy' example in figure 1(i) and is only indicative of the complexity that such interactions involve. The complexity of such task models leads us to investigate whether these are complete and consistent with real use. We, therefore, require a systematic approach, to compare the normative task model with the scenarios from reported and actual use that we are gathering from system developers, and real forecasters.

## 2. TASK ANALYSIS AS GRAMMAR

We are applying an approach which uses a parallel with the grammar of everyday language to relate the set tasks and sub-tasks in the task model to scenarios and observed behaviour. We can also apply the idea of a grammar to high level tasks that are typically found in a hierarchical task analysis. Figure 1 (ii) represents such a grammatical parsing of the HTA found in figure 1(i) based on a scenario of someone who wants to clean his/ her two-bedroom house. The actions on the left are extracted from the scenario and the numbers on the right correspond to the different tasks and subtasks in figure 1(i).
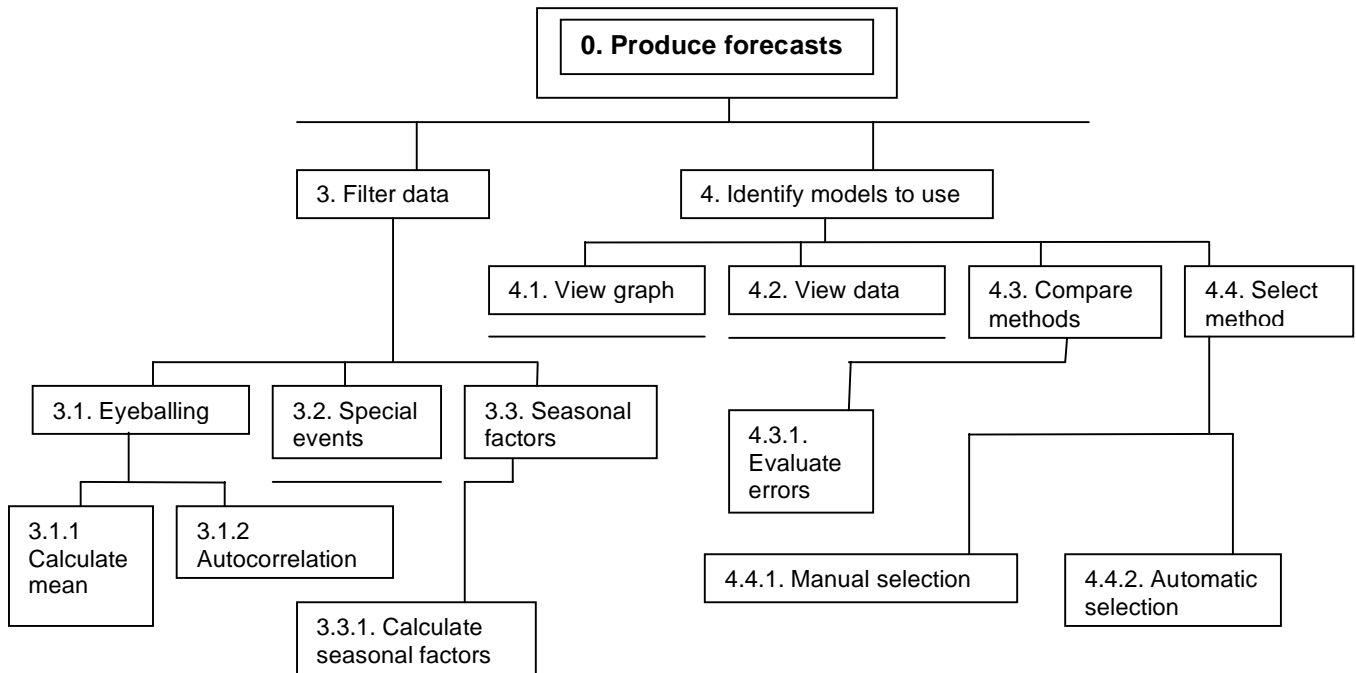
**FIGURE 2:** Hierarchical task analysis of sales forecasts

More formally, given a scenario and a task analysis we can identify five kinds of discrepancy in (a) tasks in either the task tree or scenario are at a finer granularity than the other (b) similar tasks are present, but when we try to label scenario actions the subtasks do not come in the same task-subtask hierarchy that they are in the normative model (c) tasks which are not on the tree (d) tasks which are necessary and don't occur (e) the order of the tasks.

## 3. DISCUSSION AND ASSOCIATED RESEARCH

In order to apply this technique to our normative forecasting HTA we are in the process of gathering scenarios of tasks through interviews and observations with managers and users of forecasting software. Similarly to collaborative extensions of standard task analyses, this technique can be extended to analyze group production planning goals in the organization. We believe that this grammar-based use of task analysis models can be applied in other settings in usability research and practice.

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